CLAIMS

What is claimed is:

1. An apparatus for processing asynchronous data in a multiple access system, comprising:

a plurality of received signals from a corresponding plurality of users, wherein said received signals are divided into blocks of data for each of said users;

a plurality of multiuser detector processors coupled to said received signals, wherein each of said multiuser detector processors processes a portion of said blocks for each of said users within a processing window; and

a plurality of decoders coupled to said multiuser detector processors, wherein said decoders process all the blocks for one of the users, once said multiuser detector processor is finished processing an entirety of one of said blocks for the one of said users.

2. The apparatus according to claim 1, wherein each of said received signals are respectively coupled one of said multiuser detector processors.

3. The apparatus according to claim 1, wherein each of said multiuser detector processors are respectively coupled one of said decoders.

4. The apparatus according to claim 1, wherein said decoders uses algorithms selected from the group of algorithms consisting of: Viterbi algorithm, and Bahl, Cocke, Jelinek, and Raviv (BCJR) algorithm.

5. The apparatus according to claim 1, wherein said multiuser detector processor uses algorithms selected from the group consisting of: M-algorithm, T-algorithm, FANO, or reduced state Viterbi, maximum a posteriori (MAP) decoders and soft-output Viterbi algorithm (SOVA) decoders.

6. The apparatus according to claim 1, further comprising a parameter estimator coupled to said received signals and to said multiuser detector processors, wherein a size of said processing window is determined by said parameter estimator.

7. The apparatus for digital processing according to claim 1, further comprising an interleaver coupled between said multiuser detector processors and said decoders and a deinterleaver coupled between said decoders and said multiuser detector processors.

8. A digital processing system performing Turbo MUD processing on multiple access communications, comprising:

a parameter estimation unit coupled to a plurality of received user signals, wherein each of said user signals are a plurality of blocks of data;

a multiuser detector coupled to said parameter estimation unit, wherein said multiuser detector processes said blocks of data for each of said user signals in a partial manner with a processing window defined by frame boundaries, and wherein said multiuser detector outputs processed blocks of data; and

a bank of decoders coupled to said multiuser detector, said decoders processing all of said processed blocks of data for one of said user signals as soon as one of said blocks of data for one of said user signals has been processed by said multiuser detector in its entirety, wherein said decoders produce improved processed blocks of data.

9. The digital processing system according to claim 8, wherein said improved processed blocks of data are fed back to said multiuser detector for iterative processing.

10. The digital processing system according to claim 8, wherein said processing window is edge triggered.

11. The digital processing system according to claim 8, wherein said processing window is triggered to commence processing on a central bit.

12. The digital processing system according to claim 8, wherein said decoders uses algorithms selected from the group consisting of: Viterbi algorithm, and Bahl, Cocke, Jelinek, and Raviv (BCJR) algorithm.

13. The digital processing system according to claim 8, wherein said multiuser detector uses algorithms selected from at least one of the algorithms from the group of algorithms consisting of: M-algorithm, T-algorithm, FANO, or reduced state Viterbi, maximum a posteriori (MAP) decoders and soft-output Viterbi algorithm (SOVA) decoders.

14. The digital processing system according to claim 8, further comprising a synchronization unit coupled to said multiuser detector determining which of said processed blocks of data to decode.

15. A method for processing signals from multiple users each having synchronized bit streams within blocks of data, comprising:
performing parameter estimation of said bit streams;
processing said bit streams using a multiuser detector, wherein said multiuser detector processes a portion of each of said blocks of data within a frame boundary;
interrupting said processing at each said frame boundary, wherein one of said blocks of data is completely processed for one of said users at each said frame boundary;
decoding all of said blocks of data from said multiuser detector for said one of said users and producing a higher quality symbol bit stream;
refreshing said one of said blocks of data;
repeating said steps of interrupting, decoding and refreshing until a final state is obtained; and,

outputting a final symbol stream for each user.

16. The method for processing signals from multiple users according to claim 15, wherein said final state is a fixed number of iterations.

17. The method for processing signals from multiple users according to claim 15, wherein said final state is an allowable performance level.

18. The method for processing signals from multiple users according to claim 15, further comprising the steps of de-interleaving and interleaving.

19. The method for processing signals from multiple users according to claim 15, wherein said processing is performed in parallel.

20. The method for processing signals from multiple users according to claim 15, wherein said processing is performed sequentially.